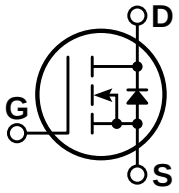
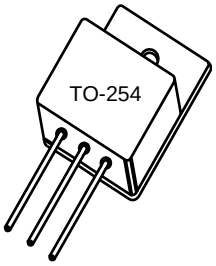




ADVANCED POWER TECHNOLOGY®

2N7228 500 Volt 0.415Ω
JX2N7228*
JV2N7228*

POWER MOS IV™

*QUALIFIED TO MIL-S-19500/592 31/7/92

JEDEC REGISTERED N-CHANNEL HIGH VOLTAGE POWER MOSFETS

MAXIMUM RATINGS All Ratings: T_C = 25°C unless otherwise specified.

Symbol	Parameter	2N7228	UNIT
V_{DSS}	Drain-Source Voltage	500	Volts
V_{GS}	Gate-Source Voltage	±20	
I_D	Continuous Drain Current @ T_C = 25°C	12	Amps
	Continuous Drain Current @ T_C = 100°C	8	
I_{DM}	Pulsed Drain Current ①	48	
I_{AR}	Avalanche Current ①	12	
P_D	Total Power Dissipation @ T_C = 25°C	150	Watts
	Total Power Dissipation @ T_C = 100°C	60	
	Linear Derating Factor	1.2	W/K
E_{AS}	Single Pulse Avalanche Energy	750	mJ
E_{AR}	Repetitive Avalanche Energy	15	
T_J,T_{STG}	Operating and Storage Junction Temperature Range	-55 to 150	°C
T_L	Max. Lead Temp. for Soldering Conditions: 0.063" from Case for 10 Sec.	300	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage (V_{GS} = 0V, I_D = 250μA)	500			Volts
$V_{GS}(TH)$	Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 250μA)	2		4	
I_{DSS}	Zero Gate Voltage Drain Current (V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V)			25	μA
	Zero Gate Voltage Drain Current (V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V, T_C = 125°C)			250	
I_{GSS}	Gate-Source Leakage Current (V_{GS} = ±20V, V_{DS} = 0V)			±100	nA
$I_D(ON)$	On State Drain Current ② (V_{DS} > $I_D(ON)$ x $R_{DS}(ON)$ Max, V_{GS} = 10V)	12			Amps
$R_{DS}(ON)$	Drain-Source On-State Resistance ② (V_{GS} = 10V, I_D = 8.0A)			0.415	Ohms
	Drain-Source On-State Resistance ② (V_{GS} = 10V, I_D = 8.0A, T_C = 125°C)			0.900	
	Drain-Source On-State Resistance ② (V_{GS} = 10V, I_D = 12.0A)			0.515	

CAUTION: These Devices are Sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

APT Website - http://www.advancedpower.com

USA
405 S.W. Columbia Street **Bend, Oregon 97702-1035** **Phone: (541) 382-8028** **FAX: (541) 388-0364**
EUROPE
Avenue J.F. Kennedy Bât B4 Parc Cadéra Nord **F-33700 Merignac - France** **Phone: (33) 5 57 92 15 15** **FAX: (33) 5 56 47 97 61**

051-5015 Rev D

DYNAMIC CHARACTERISTICS

2N7228

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{DC}	Drain-to-Case Capacitance	f = 1 MHz		12	24	pF
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 25V, f = 1 MHz		2410	2900	pF
C_{oss}	Output Capacitance			356	530	pF
C_{rss}	Reverse Transfer Capacitance			125	235	pF
Q_g	Total Gate Charge	V_{GS} = 10V, V_{DD} = 0.5 V_{DSS}, I_D = I_D [Cont.] @ 25°C		103	150	nC
Q_{gs}	Gate-Source Charge			14	21	nC
Q_{gd}	Gate-Drain ("Miller") Charge			42	70	nC
$t_d(on)$	Turn-on Delay Time	V_{GS} = 10V, V_{DD} = 0.5 V_{DSS}, I_D = I_D [Cont.] @ 25°C, R_G = 2.35Ω		14	35	ns
t_r	Rise Time			21	190	ns
$t_d(off)$	Turn-off Delay Time			38	170	ns
t_f	Fall Time			12	130	ns

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)			12	Amps
I_{SM}	Pulsed Source Current ① (Body Diode)			48	Amps
V_{SD}	Diode Forward Voltage ② (V_{GS} = 0V, I_S = -I_D [Cont.])			1.7	Volts
t_{rr}	Reverse Recovery Time (I_S = -I_D [Cont.], dI_S/dt = 100A/µs)		296	1600	ns
Q_{rr}	Reverse Recovery Charge (I_S = -I_D [Cont.], dI_S/dt = 100A/µs)		3.5	8.8	µC

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.83	K/W ③
$R_{\theta JA}$	Junction to Ambient			31	K/W ③

① Repetitive Rating: Pulse width limited by maximum junction temperature. See Transient Thermal Impedance Curve. (Fig.1)

② Pulse Test: Pulse width < 380 µS, Duty Cycle < 2%

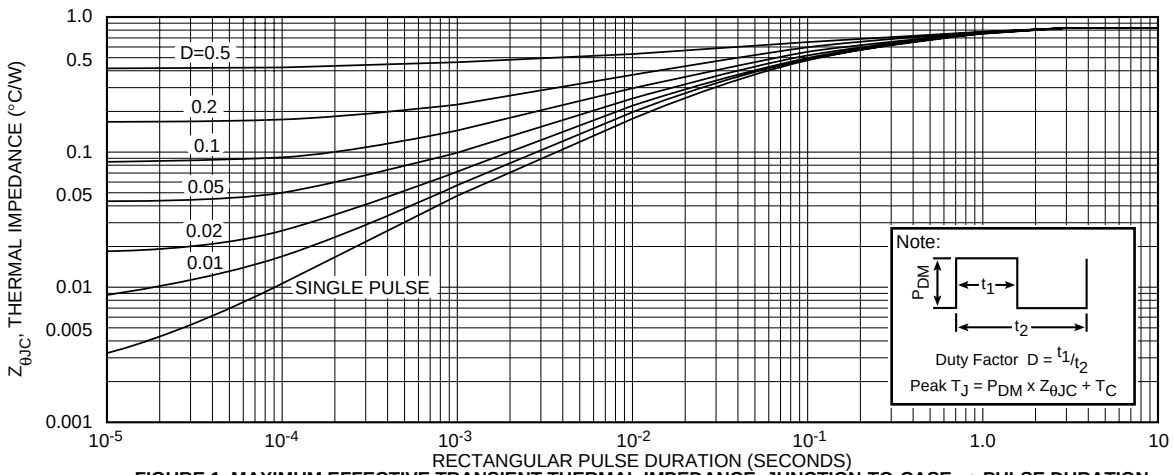


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

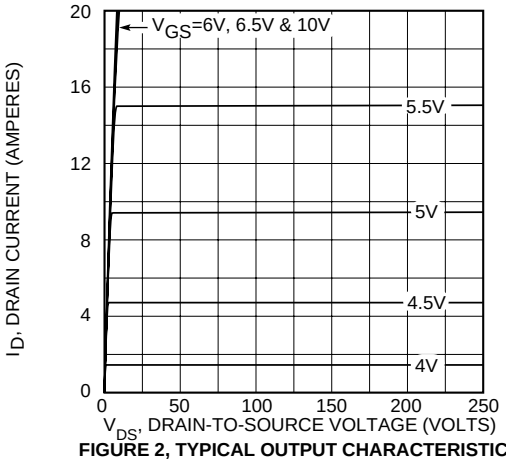


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

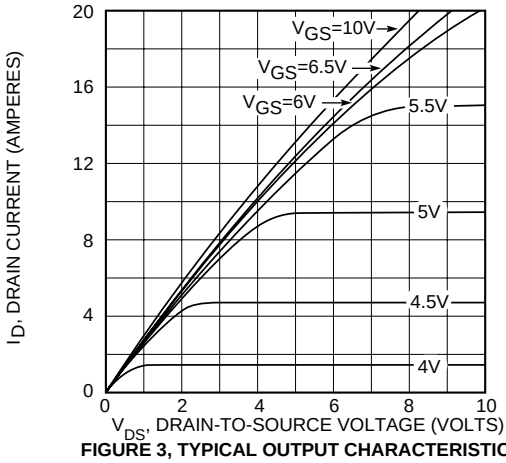


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

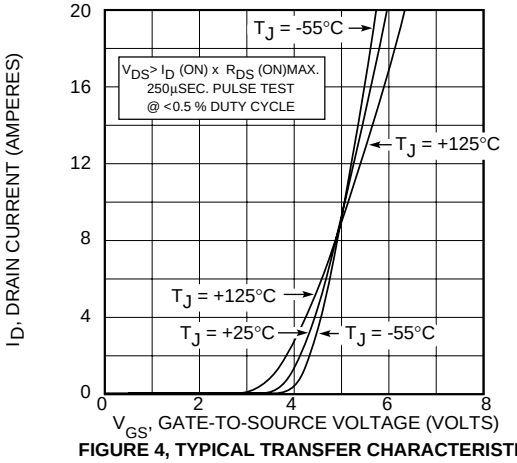


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

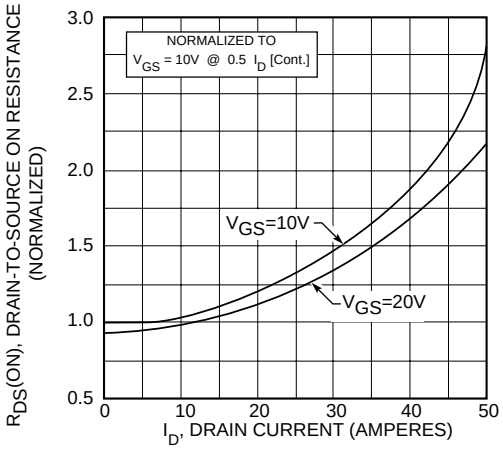


FIGURE 5, R_{DS}(ON) vs DRAIN CURRENT

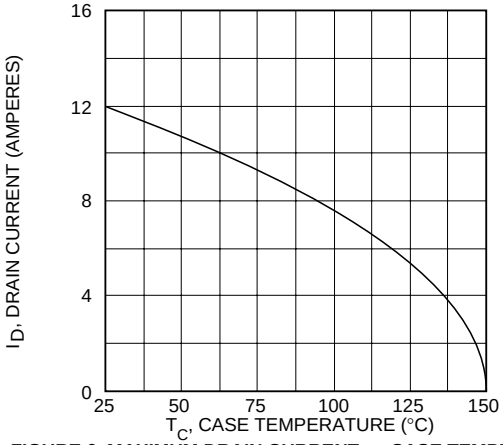


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

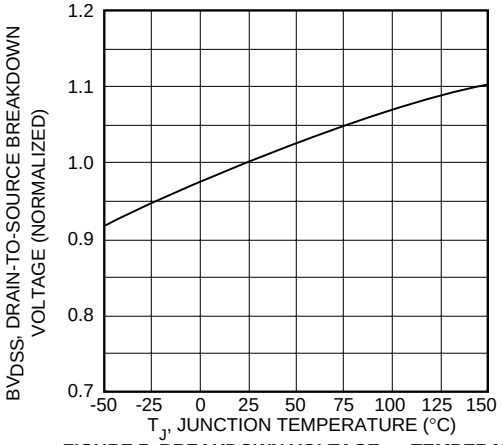


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

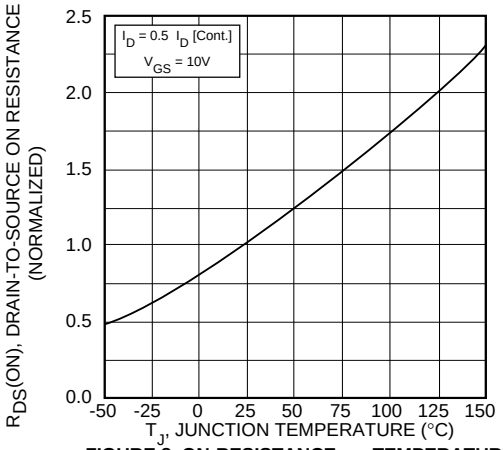


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

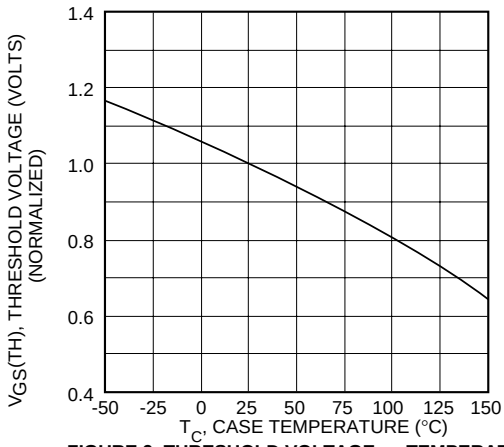


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

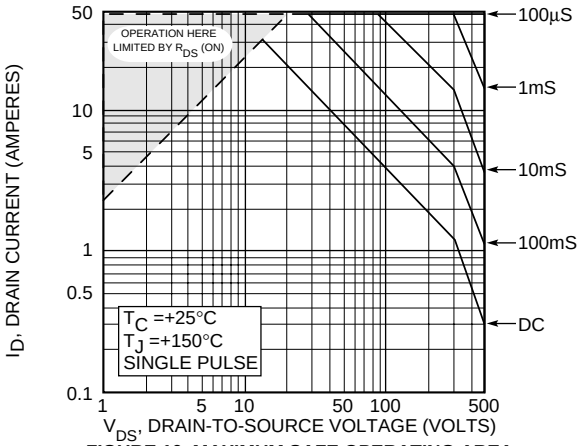


FIGURE 10, MAXIMUM SAFE OPERATING AREA

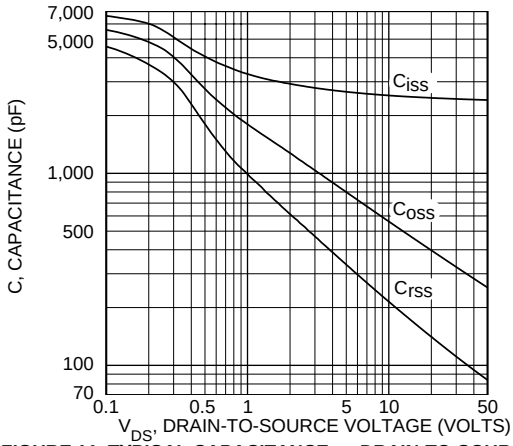


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

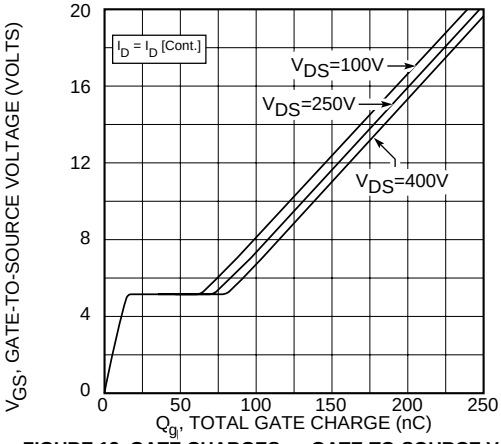


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

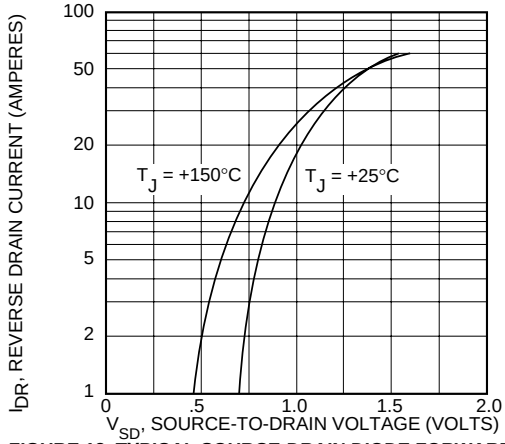
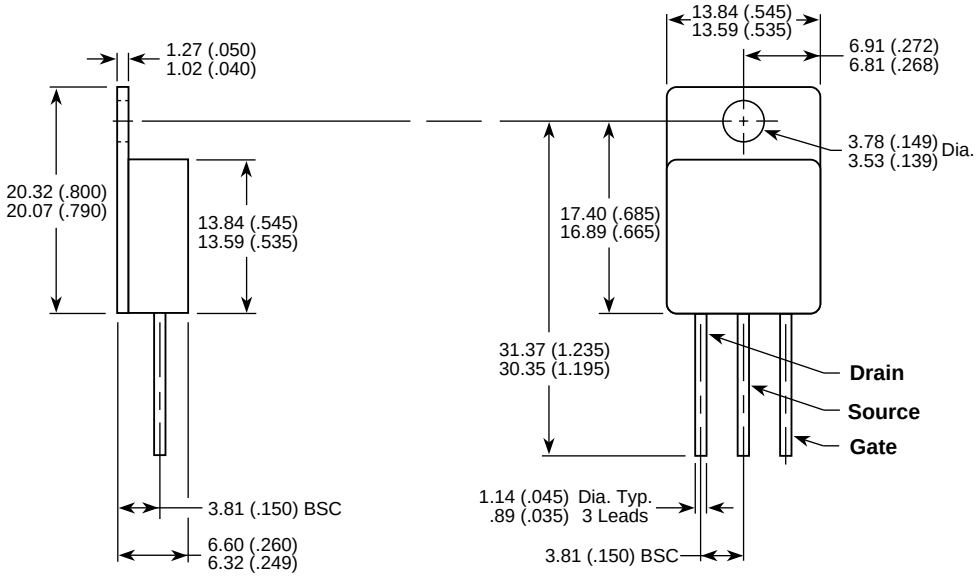


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-254AA Package Outline



Dimensions in Millimeters and (Inches)